Inventor: MATSUKAWA et al.
Docket No.: 10873.1179USW1
Title: MAGNETORESISTIVE ELEMENT AND METHOD FOR MANUFACTURING THE SAME Attorney Name: Douglas P. Mueller Phone No.: 612-371-5237 Sheet 1 of 6 21 _15 FIG. 1A _13 50nm 10 21 -₋₁₅ FIG. 1B _13 50nm 22 21 15 10 Qi FIG. 1C Pi 20-Ri *-*13

22

Inventor: MATSUKAWA et al.
Docket No.: 10873.1179USW1
Title: MAGNETORESISTIVE ELEMENT AND METHOD FOR MANUFACTURING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612-371-5237
Sheet 2 of 6

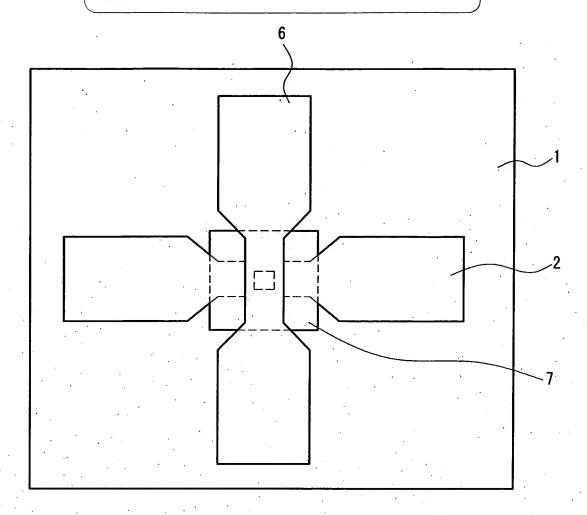


FIG. 2

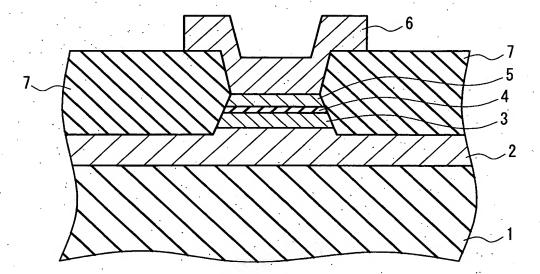


FIG. 3

Inventor: MATSUKAWA et al.
Docket No.: 10873.1179USW1
Title: MAGNETORESISTIVE ELEMENT AND METHOD FOR MANUFACTURING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612-371-5237
Sheet 3 of 6

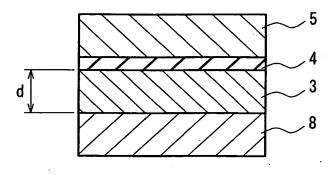


FIG. 4

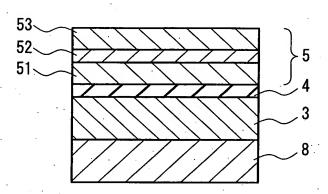


FIG. 5

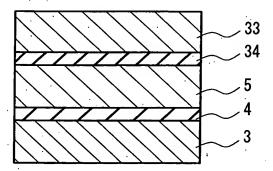


FIG. 6

Inventor: MATSUKAWA et al.
Docket No.: 10873.1179USW1
Title: MAGNETORESISTIVE ELEMENT AND METHOD FOR MANUFACTURING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612-371-5237
Sheet 4 of 6

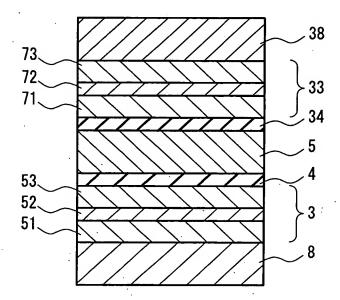


FIG. 7

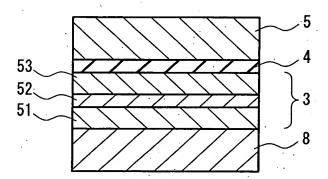


FIG. 8

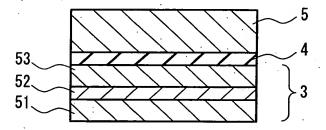


FIG. 9

Inventor: MATSUKAWA et al.
Docket No.: 10873.1179USW1
Title: MAGNETORESISTIVE ELEMENT AND METHOD FOR MANUFACTURING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612-371-5237
Sheet 5 of 6

73\ 71. 53、 52、 51

FIG. 10

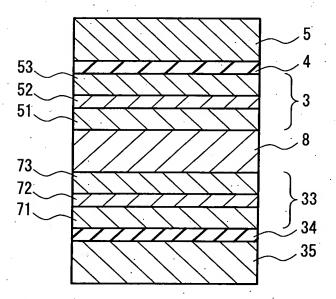


FIG. 11

Inventor: MATSUKAWA et al.
Docket No.: 10873.1179USW1
Title: MAGNETORESISTIVE ELEMENT AND METHOD FOR MANUFACTURING THE Attorney Name: Douglas P. Mueller Phone No.: 612-371-5237 Sheet 6 of 6 (a) Composition 1. Composition 2 Composition 3 FIG. 12A Composition 4 Composition 5 Composition 6 (b) Composition 1 Composition 2 Composition 3 Composition 4 FIG. 12B Composition 5 Composition 6 (c) Composition 1-Composition 2 Composition 3 Composition 4 53 Composition 5 FIG. 12C 52 Composition 6 51 (d) Composition 1 Composition 2 Composition 3 Composition 4 Composition 5 Composition 6 Composition 7

FIG. 12D

Composition 8 Composition 9